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also

page 3 reflections
page 7 products
page 12 people
page 13 awards and events
page 20 verbatim and numbers
page 21 books
page 29 www

Matthias Machnig, Deputy Environment Minister of Germany...

... explains how his country's policies have led to a dynamic expansion of electricity generation from renewable energy, strengthening its climate strategy.

generating growth - page 4

Shyam Saran, a former Foreign Secretary of India, who is now the Prime Minister's Special Envoy for Climate Change...

... describes his country's commitment to exploiting solar energy's potential and calls for a global programme to realise it worldwide.

mission possible - page 8

Yingling Liu, China Program Manager at the Worldwatch Institute...

... describes the extraordinarily rapid growth of renewable energy in China and shows how it is an intensifying force behind the country's economic growth.

China's new path - page 10

Michael Liebreich, CEO of New Energy Finance...

... describes and explains the extraordinary surge in investment in clean energy worldwide.

cleaning up - page 14

Senator **Liz Thompson,** a former Minister of Energy and Environment of Barbados...

... describes the urgent need for renewable energy in Small Island Developing States and calls on the international community to help provide it.

regaining paradise - page 16

Prof Ed Gallagher, Chairman of the UK Renewable Fuels Agency...

... describes how early enthusiasm for biofuels waned, and charts a way forward.

making biofuels sustainable - page 18

Lalita Ramdas, Board Chair Greenpeace International...

... calls for a carbon free, nuclear free revolution.

enough is enough - page 22

Martin Roscheisen, CEO of Nanosolar, Inc...

... describes a green business boom in Silicon Valley and outlines what government must do to encourage and support such innovation.

green valley - page 24

Daniel M. Kammen, the Class of 1935 Distinguished Professor of Energy in the Energy and Resources Group, the Goldman School of Public Policy, and the Department of Nuclear Engineering at the University of California, Berkeley...

... calls on the incoming U.S. president to launch a clean energy century.

innovation agenda - page 26

Australian actor **Cate Blanchett** ...

... is pioneering "greenovation" at home and work.

sunshine and light showers - page 30

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reflections

by Achim Steiner, UN Under-Secretary-General and Executive Director, UNEP

A chill wind has blown through international stock markets, and renewable energy companies have not been immune. A global index of solar stocks, the Claymore/MAC index, fell by over 50 per cent between April — when it started trading — and early November, while the New Energy Global Innovation Index fell by a huge 45 per cent in October alone.

Some have drawn parallels with the dot.com bubble when Internet start-up companies, based on marketing rather than real markets, came and went like mayflies. But this ignores hard and fast fundamentals that should make renewable energy companies far more robust and lasting.

The main driving force, climate change — unlike the stock markets — has steadily grown, not waxed and waned. Scientists studying ice cores in Antarctica estimate that greenhouse gases are now at their highest concentration for 800,000 years.

Serious long-term government commitments are emerging, partly as a result of the Kyoto Protocol and in anticipation of deeper and more comprehensive deal in Copenhagen in 2009. The European Union wants to generate 20 per cent of its energy from renewable sources by 2020, up from just over 6 per cent in 2005. British Prime Minister Gordon Brown has announced a big expansion of wind power — 7,000 turbines on- and off-shore. The U.S. government recently passed the Production Tax Credit and Investment Tax Credit, extending support for wind power by a year and for geothermal and solar power by two and eight respectively. And in the run-up to the elections, President-elect Obama pledged to invest $150 billion in clean energy over the next 10 years, generating five million jobs.

Meanwhile Clean Development Mechanism projects, now numbering over three thousand, appear unaffected by the financial crisis: new resources are being found and exploited daily, it seems. Countries like Mali and Madagascar, once outside the mechanism, are now accessing it, partly as a result of UN-linked capacity building. And renewables remain the fastest, most cost-effective and most environmentally friendly solution for many of the two billion people still without access to modern energy.

A recent survey in Ghana — part of UNEP and the Global Environment Facility's Solar and Wind Energy Resource Assessment — has found 100 square kilometres of good windy land able to generate 500 megawatts of electricity or 10 per cent of the country's needs. And a consortium including a Dutch multinational, the German Wind Energy Institute and local investors are planning a 300 megawatts wind farm in Turkana, northern Kenya.

Renewable energy companies are no longer small start-ups. Suntech Power, headquartered in Wuxi, China — the world's biggest solar manufacturer — has a market capitalization of $3.5 billion; First Solar in the United States has one of $11.3 billion.

The economic models of the 20th century are now hitting the limits of what is possible — both in terms of our ecological footprint and in delivering better livelihoods for the 2.6 billion people still living on less than $2 a day. Investments will soon be pouring back into the global economy. Will they go into yesterday's old, extractive, short-term economy or into a new Green Economy that will deal with today's challenges and generate countless economic opportunities for poor and well-off alike? Renewable energy generates three to five times more jobs than fossil fuel generation and its ecological footprint is infinitely smaller.

This edition of *Our Planet* marks the climate convention meeting in Poznan, which must be central to the transition to a low carbon, green energy economy. Strategies for long-term cooperative action on climate change must be fleshed out alongside the financial architecture needed to boost investments in renewables and other sectors. Directing the multi-billion stimulus packages being lined up by governments, allied to a reshaping and refocusing of global markets, can assist success.

However the biggest stimulus package of all — which could set the stage for sustainable growth in the 21st century — must come in Copenhagen next year. If the international community can make this a big deal in every sense of the word, we will be a long way to a Global Green New Deal that will meet the genuine development needs of 6.7 — rising to 9 — billion people.

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Cover photo © ADRIAN WILSON / Beateworks / Corbis. 'New Green Deal' is the phrase on the lips of world leaders on the eve of the December 2008 climate change negotiations in Poznan, Poland. With economies in turmoil around the world, and global warming firmly installed at the top of the international political agenda, the development of renewable and clean energy options looks like a classic 'win-win-win' situation: curbing greenhouse gas emissions, addressing growing concern over energy security, and providing new employment opportunities for millions. This issue of *Our Planet* explains how.

generating growth

by Matthias Machnig

When senior German executives were asked by a major economics newspaper to name the business with the greatest future potential, three quarters cited renewable energy. In the past two years, for example, 15 new solar module factories have gone into operation or been under construction in Germany — representing an investment of around 1 billion Euros. Meanwhile, at the new Alpha Ventus test site in the North Sea, German manufacturers are developing technologies to advance offshore wind energy use and are demonstrating the suitability of large-scale 5 megawatt wind turbines, which can also make important future contributions onshore.

All these are signs of the flourishing, innovation-friendly and dynamically growing renewable energy technology sector. It owes its current standing to a far-sighted energy policy which, in view of globally rising demand, is the best insurance against limited resources, climate threats and supply shortages.

Good renewable energy policy is characterised by reliability, consistency, flexibility, credibility and transparency — criteria the German Government is committed to meeting. As early as 1991 — 17 years ago — the Electricity Feed Act was established as one of the first systematic support instruments for renewable electricity. In 2000, the Renewable Energy Sources Act (EEG) followed; it distinguishes between the different sources and was recently evaluated and improved.

The EEG started a rapid development of renewable electricity generation, particularly from wind, solar and biomass energy sources. Within just 10 years its share of gross electricity consumption has almost tripled from around 5 to over 14 per cent. We have thus already far exceeded the 12.5 per cent target set by the European Commission for Germany for 2010.

Renewable energies have long ceased to be a niche product and are now a mainstay of the electricity industry. They also play a substantial role in other sectors, satisfying 6.6 per cent of our demand for heat and 7.6 per cent of our demand for fuel. We must continue on this successful course, for our goal is extremely ambitious. We aim to generate at least 30 per cent of our electricity from renewable sources in 2020, and to continue this growth: after 2030, they should account for more than half Germany's electricity supply.

This growth has a positive effect in combating climate change. In 2007, renewables in Germany saved over 115 million tonnes of CO_2 emissions from electricity generation, heat supply and transport. The EEG itself contributed savings of 57 million tonnes. This equals more than 7 per cent of Germany's emissions and amounts to 13 million tonnes more than in the previous year. We will increase this figure. In 2020 the EEG alone will save over 100 million tonnes of CO_2 emissions. The feed-in system for electricity from renewable energies is the only German policy instrument that can bring about such huge reductions in climate-damaging emissions. It is irreplaceable if we are to achieve a 40 per cent reduction in our total greenhouse gas emissions by 2020 over 1990 levels.

The EEG's recipe for success has four ingredients: guaranteed connection of all renewable energy installations to the electricity grid; priority purchase and distribution of the electricity they generate; fixed feed-in tariffs for the different types of renewables, generally laid down for 20 years; and, not least, the long-term, clear and reliable target for renewable energies' share of electricity consumption — which we have just raised from at least 20 to at least 30 per cent by 2020. Installers and manufacturers of renewable energy technologies confirm that the planning and investment security created by the EEG plays a major part in its success. Fixed feed-in tariffs carry a low risk, giving them an advantage over quota provisions combined with tradable certificates. This creates the conditions which enable investors to build new factories and power plants, for installation manufacturers to conduct intensive research and development and for banks to offer low-interest credits.

The European Commission confirmed this again in January 2008 when, comparing support instruments for renewable energies, it concluded that well-adapted feed-in regimes — like the EEG — are generally the most efficient and effective of them. So it is no wonder that Germany exports the EEG as well as wind turbines and solar modules: around 50 countries worldwide now have a similar system of feed-in tariffs.

Importantly, the Act was not intended to be a static set of provisions, but was aimed at encouraging innovations through sophisticated mechanisms to drive renewables rapidly up the economic learning curve. Degression rates, bonuses for especially innovative technologies and a regular review of the Act ensure its present and future effectiveness.

Innovation also means thinking about how we can best integrate renewable sources' rapidly growing share into the electricity system. We have fine tuned the feed-in management system that comes into play when there are bottlenecks in the grid. We are also developing different incentives to ensure that renewable energies not only provide electrical energy but can also take on other functions, such as voltage and frequency control and reactive power compensation or involvement in the balancing energy market. Storage, load management and the precise optimisation of the electricity grid infrastructure are also important. Progress in information and communication technologies now allows us to interconnect many decentralised generators and loads in a 'virtual combination power plant' whose technical properties are equal to a conventional large-scale power plant. We will intensify our support for this development to ensure that, in the long-term, modern renewable energy sources become the majority share of electricity supply.

Currently, the higher costs for renewable energies are paid by electricity consumers. In 2007 the additional purchase costs amounted to 4.3 billion euro — which, for an average German household, means additional costs of around 3 Euros per month. Even though these costs are set to rise moderately over the next couple of years during the continued expansion, renewable energies will be more cost-effective than conventional energy sources in around 10 years time. Then Germany will reap the rewards of its groundwork and benefit from annually increasing savings.

Our domestic economy is already profiting. The Euros invested reduce import dependency; renewable electricity gives us protection from fossil fuel prices which will continue to rise; and eco-power plants curb electricity prices on the stock exchange. We are, moreover, creating a favourable climate for a sector which had a total turnover of nearly 25 billion Euros in 2007, securing around 250,000 jobs — particularly in regions of eastern Germany most affected by structural change.

In a nutshell: climate protection is the most intelligent form of economic policy. It initially costs money, but ultimately leads to a genuine 'vorsprung durch technik' (head start through technology). The export market is gaining in importance, as many countries adopt ambitious expansion targets for renewable energies; the German wind sector's export quota now stands at 70 per cent. Although investments in new wind turbines in Germany have fallen, the companies which operate internationally have seen an increase in turnover thanks to the "first mover advantage".

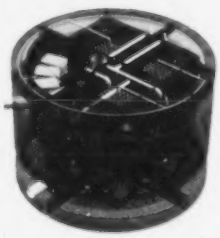
The EEG can only be one component of our policy for the future. The Integrated Energy and Climate Programme, which we have developed in recent months and which, to a large extent, has already been legally implemented, comprises 29 measures: the new EEG; support programmes for heat from renewable energies; underground cabling to accelerate grid expansion and more stringent insulation stringent standards in buildings being just a few. We will strengthen electricity generation from climate-friendly combined heat and power plants and double our energy productivity by 2020, clearly showing that we are focusing on energy efficiency alongside renewables. With these two closely interlinked strategic elements we will continue along our chosen path to protect the climate.

products

Water wise

In these days of droughts and global warming, it is ever more crucial to stop needlessly wasting water. One solution is the Venus, a septic system that takes your household water — including sewage — and cleans it up so that it can be used for yard irrigation. This makes the Venus – designed by Danish company Biokube — much more efficient than ordinary tanks, which settle solids out via sheer gravity. The Venus puts the water through several membranes housing bacteria, making it clean enough to go straight into your soil.

www.biokube.co.uk



Ethical fashion

The Re: Fashion Awards are the world's first ethical fashion awards. Presented in London on 13 November, the twelve awards "celebrate social and environmental improvements in retail, manufacture and consumer engagement." Categories include Retailer of the Year, the Cotton Award and the Africa Award.

In a sign that sustainable fashion is no longer the domain of hemp-wearing radicals, the glitzy event brought together scenesters like Pixie Geldof and Ozwald Boateng and featured fashion by leading designers, including Vivienne Westwood.

The Environment Award went to Veja — a French company that produces sneakers through small producers in Brazil — for its pioneering work replacing traditional cotton by organic cotton, supporting wild latex production in Amazonia to fight against deforestation, and using ecological leather instead of chrome tanned leather.

Pachacuti, won both the Business Award and the People Award. A Fairtrade fashion company, it produces a range of goods from alpaca knitwear to Panama hats that aims to improve the lives of Andean producers.

And the Cotton Awards went to Pants to Poverty, an organization that sells organic underwear through ethical and independent shops to raise money for the Make Poverty History campaign.

www.refashionawards.org

Electric scooter

No fumes, no noise, no emissions and no visits to the gas station — the Chinese-built Ego Street Scoota is a 100 per cent electric scooter that can be charged using the mains electricity supply. The bike has a 30-to 40-mile range and a top speed of 30 mph — not bad considering it only costs around eight pence for an eight-hour charge. Could this be the answer to high fuel prices, congestion and, ultimately, global warming?

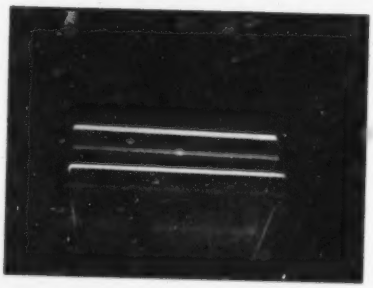
http://www.firebox.com/product/2166/Ego-Electric-Street-Scoota

Helping refugees

The Gaia Association won an Ashden Award earlier this year for its work providing ethanol-fuelled stoves to around 1,800 families in eastern Ethiopia's Kebribeyah refugee camp. Some 17,000 people live in the camp, having fled conflict in neighbouring Somalia — and they rely on fuelwood for cooking. The Gaia Association's project is helping to prevent the indiscriminate wood use which has contributed to extensive deforestation in the area, as well as greatly improving the refugees' living conditions. The ethanol is produced from locally-available molasses, a sugar by-product which previously caused pollution.

www.gvepinternational.org

Solar concentrator



We could soon collect solar energy through our windows. Researchers at the Massachusetts Institute of Technology have developed a light-absorbing dye that, when painted on a window, transfers energy via the glass into solar cells at the window's edges. The scientists found a 30 per cent higher performance with the combined system of light-absorbing dye and solar panels compared to a stand-alone solar cell. Ultimately, they think this approach will allow us to nearly double the performance of existing solar cells for minimal added cost. The 'solar concentrator' could be marketed within three years.

http://www.guardian.co.uk/environment/2008/jul/10/solarpower.renewableenergy

Solar-powered radio

The world's first solar-powered digital radio, launched by British company Roberts, capitalizes on solar energy while avoiding the environmental scourge of batteries — no mean feat given that the U.K., for example, consumes around 30,000 tonnes of portable batteries every year. The radio provides up to 27 hours of listening away from sunlight.

http://www.biggreensmile.com/products/roberts-solar-powered-dab-radio/rbsoldab.aspx?productid=rbsoldab

mission possible

by Shyam Saran

The Sun has long been recognized as the primal source of all energy on Earth. In an ancient civilization like India's, it has been worshipped as a god who bestows life-sustaining heat and light to all living beings. Sunlight is locked up as usable energy in fossil fuels and carbon, but these are finite and are being rapidly depleted. Yet the Sun's direct energy is inexhaustible and constantly renewable. The energy in sunlight that reaches our earth in just 40 minutes is equivalent to current global energy consumption for a year — and what is more, solar energy in itself is totally free.

India has significant advantages it can leverage in promoting solar energy as an alternative and renewable energy source. Firstly, the intensity and duration of sunlight available on its landmass is relatively greater than in many other heavily populated regions of the world. Just 1 per cent of India's land area can meet its entire electricity requirements up to 2030. Secondly, the country's very size permits a rapid build-up of capacity to levels that can allow significant economies of scale.

Another factor adds to the attractiveness of solar power, even at current technological levels. India's peaking power requirements during the daytime hours provide a virtually precise fit to the availability of solar power through photovoltaics.

The Prime Minister of India launched the country's first National Action Plan on Climate Change on 30 June this year. Among the eight National Missions which form the substantive content of the Plan, the National Solar Mission has been given pride of place. This fits in very well with the Plan's basic thrust, which is to bring about a strategic shift from India's reliance on fossil fuels and conventional sources of energy to a progressively greater use of renewable sources of energy. This would serve the country's quest for energy security as well as help meet the challenge of climate change.

India is now in the process of elaborating its National Solar Mission into an ambitious but actionable project. We are looking at what could be realistic targets for the year 2020, and for 2050, given both the advantages we possess and the constraints we face. Different currently available technologies, such as solar photovoltaic and solar thermal, are being evaluated for their suitability in different applications. A regulatory and incentive framework is being evolved to provide a predictable and efficient policy framework that could, with a modest investment, trigger large-scale development of solar energy. The objective is to use any government support — whether in the form of capital subsidy or feed-in-tariff — as a temporary and declining charge on government, so that the industry becomes viable as quickly as possible. We are studying the experience of other countries which have initiated similar plans to promote solar energy and are exploring opportunities for mutually beneficial collaboration with several partner countries.

India wishes to become the leading solar nation of the world, in terms both of the scale of its application and of focussed research and development (R&D) work. Our objective is to promote technological innovations and improvements in existing technologies. This would bring costs down and increase efficiency. At the same time, we are trying to create a well-funded R&D network that could explore cutting-edge technologies with a view to making solar applications as user-friendly and convenient as possible. The focus will be on cost-effective, environmentally friendly storage technologies, which would enable solar power to be stored and used as and when required.

India has a very comprehensive science and technology network and a significant number of world class research institutions that could be mobilized for this. Nevertheless, the ambitious nature of the programme we envisage would also require a plan for building human capacity. This, too, is being prepared as part of the National Solar Mission.

India believes that the promotion of renewable energy — particularly solar energy — could play a significant, and perhaps even decisive, role in meeting the challenge of climate change. Its merit lies in the accompanying benefit that it also advances energy security. We need a truly collaborative effort, publicly funded, on a global scale, to accelerate the diffusion of existing solar technologies. We also need to explore technological innovations aimed at achieving more radical solutions, especially in solar energy storage.

The current economic and financial crisis has demonstrated the willingness of countries to inject billions of dollars of public funds to rescue their economies. A modest part of these public funds could also be mobilized to fund a global campaign to promote solar energy. This would create new industries, new jobs and encourage technological innovation. It could become part of the solution to the economic crisis, and not, as it currently appears, its casualty.

China's new path

by Yingling Liu

China is at an energy crossroads. The dominance of coal in its energy structure — and the country's avid search for new energy sources around the globe — have heightened concerns over energy security and environmental and economic sustainability, not to speak of China's contribution to the global climate challenge. As its energy consumption rises, never has it been so urgent for China to find clean energy alternatives and expand their share in the total energy mix.

Indeed, this is happening on the ground. A combination of government policies and the market has recently driven a renewable energy boom in China. It shows how state policies can encourage and sustain the development and expansion of industries for a new market niche, and how market forces can inject vitality into the private sector and thus greatly hasten the achievement of policy goals. This mutual reinforcement between policies and the market is likely to prove the most lasting and profound force in pushing China towards a new energy path.

China's landmark renewable energy law — passed in 2005 and coming into effect at the start of 2006 — has been the most decisive policy tool. It requires the government to formulate development targets, strategic plans, and financial guarantee measures for renewable energy, and provides preferential guidance on cost sharing frameworks, grid accessibility and pricing mechanisms. The law, together with a series of implementation regulations, has caused the immediate take-off of several renewable energy industries such as wind, solar photovoltaic (PV) and biomass, and reinforced the expansion of others, including hydropower and solar hot water.

Wind power has recently been the fastest growing renewable energy source. The law gave the long-dormant industry a jumpstart, and the unexpectedly enthusiastic response from the market caused policy makers to hasten to raise its short- and mid-term targets. Additional installed capacity grew by over 60 per cent in 2005, and more than doubled in both 2006 and 2007. By the end of 2007, cumulative capacity had reached roughly 6 GW — up from just 0.8 GW in 2004 — ranking China fifth among all the world's nations for wind installations. Cumulative installations in 2007 exceeded the target set for 2010 just one year ago, and the 2020 target of 30 GW is expected to be reached by 2012, eight years ahead of schedule.

China's solar PV industry has also seen phenomenal development. Surging worldwide demand — particularly from Europe and the U.S. — has encouraged the development of a world-class solar PV manufacture base in China, literally from scratch. The country's total solar cell production jumped from less than 100 MW in 2005 to 1,088 MW in 2007, making it the world's top producer. Chinese experts and business leaders believe that production will exceed 5 GW by 2010, accounting for a third of the world total, and reaching 10 GW by 2015. Though the lion's share of China's production is for overseas markets, the country is unquestionably turning into a major global solar PV base.

Biomass energy is starting to shift from traditional burning in rural homes to commercialized industrial-scale power generation. China has prioritized this since the energy law took effect. Mainly using waste from the agriculture and forestry sectors, installed capacity is projected to increase from 2 GW in 2005 to 30 GW by 2020, providing a growing share of the country's green electricity.

The recent policy tools have also consolidated and advanced traditional renewable energy industries, including hydropower and solar thermal panels, where China has already been a world leader. The technologies are comparatively simple and low-cost, and the country has developed fairly strong construction, manufacturing and installation industries for both sources. They are still dominant in China's renewable energy use, and are expected to see continuous strong growth.

Hydropower accounts for about two-thirds of China's current renewable energy use. It has grown by over 8 per cent annually from 2002 to 2006, and installed capacity will reach 190 GW by 2010 and 300 GW by 2020. China also has nearly two-thirds of the world's solar hot water capacity: more than one in every ten households bathe in water heated by the sun. Such solar thermal has witnessed 20-25 per cent annual growth in recent years, with installed capacity rising from 35 million square metres in 2000 to 100 million square metres by the end of 2006. The government aims for 150 million square metres by 2010 and double that figure by 2020. A more optimistic prediction envisages 800 million square metres installed capacity by 2030, which would mean that more than half of all Chinese households would be using solar energy for water heating.

Renewable energy has become a strategic industry in China. The country has more than 50 domestic wind turbine manufacturers, over 15 major solar cell manufacturers and roughly 50 companies constructing, expanding or planning for polysilicon production lines, the key components for solar PV systems. Those two industries together employ some 80,000 people. The country also has thousands of hydropower manufacturers and engineering and design firms. More than a thousand solar water heater manufacturers throughout the country — and associated design, installation and service providers — provide some 600,000 jobs. As renewable industries are scaled up, costs will come down, enabling faster and wider utilization, and private industry will have an increased stake in lobbying for a bigger share of the domestic market.

China currently gets 7.5 per cent of its primary energy from renewable energy sources. The government aims to expand that to 15 per cent by 2020. Yet development in the marketplace shows that this target could well be exceeded, and that its share will keep rising beyond 2020. The takeoff and strong advancement of renewable energy in China is significant not just in green powering of China's future economic growth, but in providing hope for environmental well-being worldwide.

people

Following the historic U.S. election on 4 November, all eyes are on President-elect **BARACK OBAMA** to see what change he will bring when he takes office in January. News of Senator Obama's victory

brought congratulations from a variety of environmentalists and leaders around the world. Yvo de Boer, Executive Secretary of the UNFCCC, which is tasked with working towards an inclusive, comprehensive and ratifiable deal at the crucial climate talks scheduled for December 2009, said he was "very encouraged" by Barack Obama's stance on global warming. German Foreign Minister Frank-Walter Steinmeier said the world has to work more closely together on the environment to create a "New Green Deal" after Obama's election victory, while Canada's Prime Minister Stephen Harper said he hoped to work with the President-elect on a North American deal for curbing greenhouse gas emissions linked to global warming. According to his campaign statements, the incoming President will radically depart from current U.S. climate and energy policies to create a green energy economy and "make the U.S. a leader on climate change". Proposals include setting a goal of reducing U.S. emissions to 1990 levels by 2020 and by 80 per cent by 2050, using a cap-and-trade system. Nor would he wait for emerging industrial giants such as China and India to act, though he may insist they must not be far behind in making their own binding commitments. Other proposals include a 10-year clean energy programme worth 150 billion dollars – including a target of 10 per cent of electricity from renewable sources by 2012, and 25 percent by 2025 – which is envisaged to create 5 million new jobs.

Another landmark election on the other side of the globe saw **MOHAMED NASHEED** attain the presidency of the Maldives. Among his first pronouncements was the intention to establish a "sovereign wealth fund" from tourist income to buy land so the 300,000 inhabitants of the 1,200 islands and coral atolls that form the Maldives can find new homes in the face of rising sea levels. "We do not want to leave the Maldives, but we also do not want to be climate refugees living in tents for decades," he said. "We can do nothing to stop climate change on our own and so we have to buy land elsewhere. It's an insurance policy for the worst possible outcome." With most of the Maldives no more than 1.5 metres above sea level, that outcome is a distinct possibility. Potential sites under discussion for relocation include India and Sri Lanka, which have similar cultures, cuisines and climates, or Australia.

The Afghan province of Bamiyan achieved global name recognition in 2001 when two World Heritage-listed Buddhist sculptures hewn from a sandstone cliff face were destroyed by the Taliban government. Seven years on, the province is set to mark a more positive note with the establishment of the country's first national park, Band-e Amir, which encompasses five spectacular lakes in the Hindu Kush. Leading the initiative to protect the country's fragile natural resources and create environmental awareness is Afghanistan's first female governor, **HABIBA SARABI**, appointed by President Hamid Karzai in 2005. Having previously served as Minister of Women's Affairs and Minister of Culture and Education, Sarabi hopes that tourism can help boost the development of one of Afghanistan's poorest provinces.

To call **T. BOONE PICKENS** bold would be an understatement. The billionaire oil tycoon-turned-environmentalist has made waves in the U.S. by announcing that he will invest his substantial oil fortune in wind power. "Don't get the idea that I've turned green. My business is making money and I think this is going to make a lot of money," he declared. Pickens recently ordered 667 turbines from General Electric, the first batch of more than 2,000 he plans for the world's biggest wind farm in Texas. When complete, the $10 billion project should produce 4,000 megawatts of power — about the same as a coal-fired power station that would provides 7 per cent of the electricity demand of a country such as the U.K. During the U.S. election campaign, Pickens tabled a plan which calls for America to produce 20 per cent of its electricity from renewables, switch its auto fleet to natural gas and expand offshore drilling. "I've been an oil man all my life, but this is one emergency we can't drill our way out of," says the ever-quotable Oklahoman.

American activist **ANNIE LEONARD** is a passionate campaigner against the absurdity of waste. In 2007, more than 3 million people around the world watched her viral documentary 'The Story of Stuff', which documents the life-cycle of our

products. With humour and clarity, the film explains where all our stuff comes from, what resources are used to create it, whose lives are affected during its production, and what happens to it when we discard it. Leonard has spent the last 20 years raising awareness of environmental health and justice issues — she is the coordinator of the Global Alliance for Incinerator Alternatives, serves on the boards of the International Forum for Globalization and the Environmental Health Fund, and has previously worked for Greenpeace International.

awards and events

Champions of the Earth and B4E

B4E

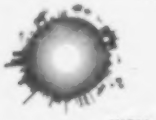
For 2009, UNEP's Champions of the Earth awards are being recast to encompass four new categories: environmental policy, business, civil society and science and technology. The new categories – which replace the award's previous regional emphasis – highlight the urgency of cooperation between all players and all sectors of society to achieve a global Green Economy. The awards will go to transformational leaders around the globe: they may be politicians, civic figures or youth leaders, and can range from musicians to economists. The award ceremony will once again take place in parallel with the annual Global Business Summit for the Environment (B4E), co-hosted by UNEP and the U.N. Global Compact, in Paris, France, in April 2009.

http://www.unep.org/champions/

Live Earth India

In July 2007, Live Earth made history with a seven-continent, 24-hour music extravaganza stretching from New York to Sydney and Johannesburg that brought together acts like The Police, Genesis, Madonna and Kanye West. Organizer Al Gore's 2008 follow-up is Live Earth India on 7 December in Mumbai. The concert will feature Jon Bon Jovi and Bollywood legend Amitabh Bachchan to raise climate change awareness. The organizers – who include Rajendra Pachauri, the chairman of the Intergovernmental Panel on Climate Change – say the event will "provide a platform so India can continue its global climate leadership". The event will benefit projects, including the Light A Billion Lives campaign and Climate Project India, dedicated to promoting awareness and finding solutions to climate change while alleviating poverty.

http://liveearth.org/



UNEP Governing Council

The UNEP Governing Council and Global Ministerial Environment Forum, 16–20 February 2009, Nairobi, Kenya, will discuss UNEP's work and the latest environmental issues. The two main themes of the meeting will be 'Globalization and the Environment – Global Crises: National Chaos?' and 'International Environmental Governance and United Nations Reform'. Ministers will discuss formally and informally the interventions necessary to create a 'green economy'. The meeting will also be attended by U.N. heads, and trade union, civil society and business leaders.

www.unep.org

2009 Year of the Gorilla

The Convention on the Conservation of Migratory Species has declared 2009 the Year of the Gorilla. Three of the four gorilla subspecies are listed as 'critically endangered' in the Red List published by the International Union for the Conservation of Nature (IUCN). Partners in the Year of the Gorilla campaign include the Great Apes Survival Partnership – under UNEP and UNESCO – and the World Association of Zoos and Aquariums. The objective of the Year is to support scientific research and conservation action for gorillas, including funding training of trainers, develop alternative sources of income such as ecotourism, and boost education and awareness.

www.yog2009.org

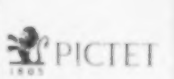
Year of the
GORILLA
Année du
GORILLE

Earth Overshoot Day

22 September was the last day in 2008 on which the world's 6.7 billion people were living in balance with the planet's biocapacity. This is according to the Global Footprint Network, a group that aims to draw attention to estimates that people are consuming 40 per cent more resources than the planet can currently replenish. The last full year when humanity was deemed to be living in resource equilibrium was 1985, when the global population was around 4.8 billion. Since then, Earth Overshoot Day has come steadily earlier each year – in 2007, it was set at October 6.

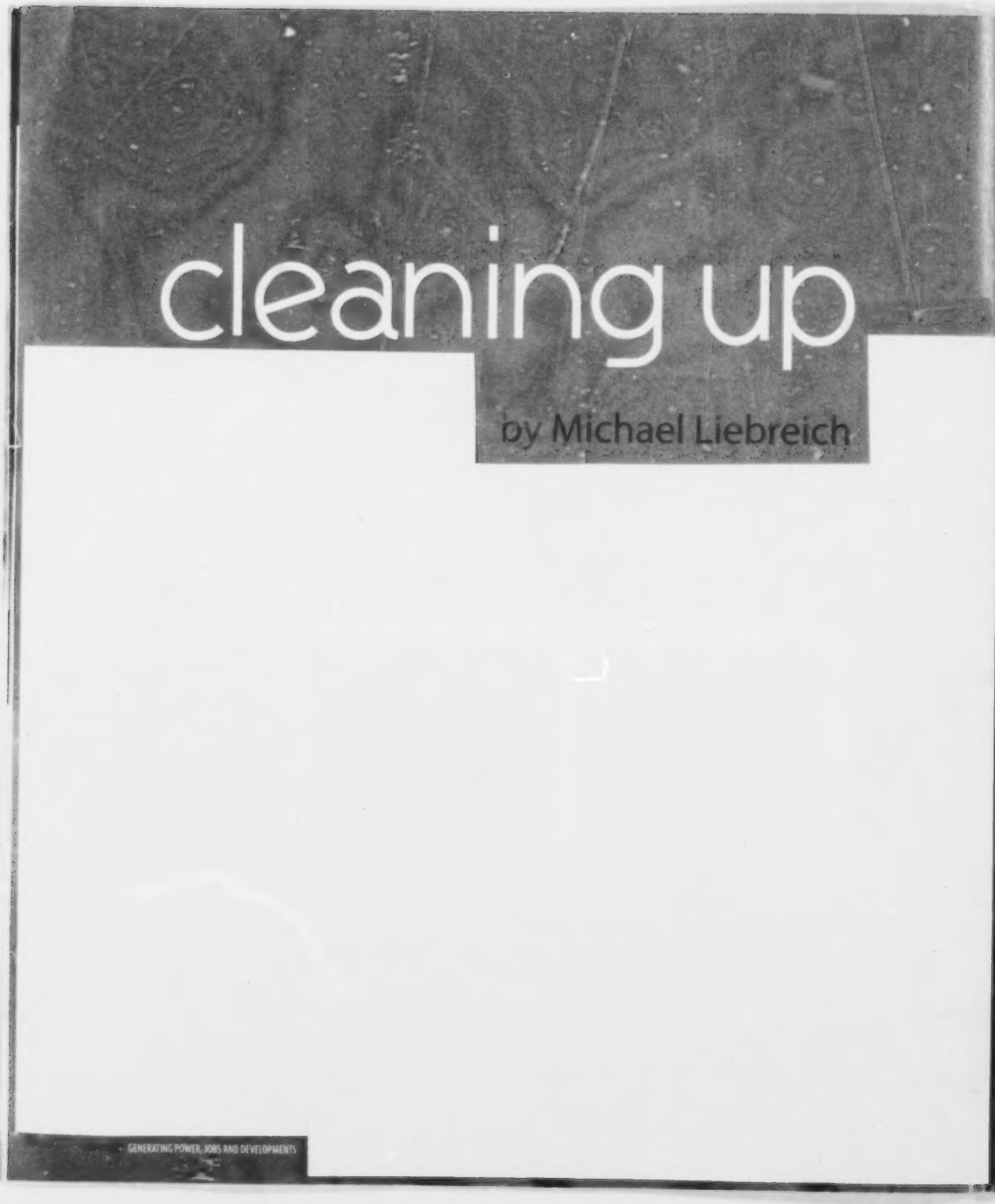
www.footprintnetwork.org

Prix Pictet



The Prix Pictet is a major new global photography prize that focuses on sustainability, rewarding photographers "and the images they use to tell stories of urgent global significance". The inaugural prize was given to Canadian photographer Benoit Aquin for his series on desertification in China entitled 'The Chinese Dust Bowl'. Mr Aquin received his prize on 30 October from former U.N. Secretary-General Kofi Annan, who said he hopes the prize "will help to deepen understanding of the changes taking place in our world and raise public awareness about the urgency of taking preventative action."

www.prixpictet.com



cleaning up

by Michael Liebreich

GENERATING POWER, JOBS AND DEVELOPMENTS

Sustainable energy and energy efficiency have soared up the world's political agenda. And the money has followed: in 2007, new investment reached $148.4 billion worldwide, up nearly five-fold from $33.4 billion in 2004. The credit crisis, which has rocked the world's capital markets to their core, has slowed this meteoric rise, but money is still flowing into clean energy in recognition of two fundamental truths: climate change is not going to go away any time soon, and exposure to high and volatile fossil fuel costs is not going to become any more palatable.

Clean energy technologies span all stages of maturity, allowing different types of investors to get in on the act. The bulk of investment is going into asset finance — building new renewable energy projects and biofuels processing capacity — which rose 68 per cent to reach $84.5 billion in 2007. Billions of dollars are also flowing into renewable energy equipment companies via the world's public markets, with $23.4 billion raised in 2007. Sustainable energy companies now account for 19 per cent of all new capital raised on the public markets by the energy sector.

Wind is the most mature clean energy technology. It accounted for more than a third of investment in renewable generation capacity in 2007 — attracting more investment than nuclear or hydroelectric power. Twenty-one gigawatts (GW) of new wind capacity was added worldwide in 2007, and in March 2008 the industry passed the milestone of 100GW installed capacity. Wind investment in 2007 was focused on the U.S., China and Spain, which together accounted for nearly 60 per cent of new wind farms built around the world. Furthermore, the development of wind technology is far from over. Funding is directed towards increasing the size and efficiency of turbines, as well as to developing massive turbines for deployment far offshore where wind quality is good and there are no neighbours to complain about the view.

Solar energy is the fastest-growing sector. A multitude of exciting new technologies and applications propelled it into the limelight in 2007, when it attracted $17.7 billion in project financing, nearly a quarter of all new investment — up a massive 250 per cent on the previous year. Solar is also the leading sector for venture capital investment, as investors back such emerging technologies as thin film, which uses less silicon or the exciting area of Solar Thermal Electricity Generation, which concentrates the heat of the sun with mirrors to produce steam and drive a conventional turbine.

It is now generally accepted that there is no silver bullet for the world's energy problems. We have to penetrate more clean energy, but we also have to use what we generate far more cleverly. Companies working on energy efficiency are also attracting record investment, especially from early-stage investors. This reflects a broader trend. A few years ago, when energy prices started to surge, investors made money by backing companies whose technologies had been struggling to break even, but which faced attractive growth prospects. More recently they have had to go back to basics and look for companies among the next generation of technologies, from cellulosic and algae-based biofuels — which bypass the conflict between food and fuel by land — through to micro-generation solar and digital energy management.

Investment in sustainable energy has not only grown in the past few years, but has also diversified geographically. As little as three years ago, clean energy meant wind and that meant investing in Denmark, Germany and Spain. Since then we have seen renewable capacity pull off and away from Europe and towards China and the U.S. China, the country which attracted 21 per cent (US$ billion) of asset financing in 2007, compared to just 11 per cent ($17.1 billion) in 2006, is the host of the next Olympic Games and India and China, indeed, have really shown their intent to become clean energy powerhouses. A few years ago, sustainable energy investment in China flowed mainly into manufacturing expansion, but the publicity surrounding the Beijing Olympic Games sharpened the country's political resolve and boosted programmes to promote cleaner power. By 2007, investment in sustainable generation capacity — excluding large hydro projects such as the Three Gorges dam — soared to $10.8 billion. And India is home to one of the world's most successful wind turbine producers, Suzlon.

True, renewable energy would not be competitive on a stand-alone basis with coal-fired power. But three things are working to level the playing field. First, carbon prices are increasing the cost of dirty power — as can be seen by the number of coal-fired plants being struck off the drawing boards in the U.S. and Europe. Second, renewable energy is becoming cheaper as technologies increase in scale and operating experience (although this trend has been obscured recently by surging commodity prices and supply chain bottlenecks; there is no doubt it is still powerfully at work). Third, an increasingly robust web of policy is being woven into place to support clean energy around the world — whether in the form of research grants, accelerated depreciation allowances, feed-in tariffs, renewable portfolio standards or green certificates. The fossil fuel industry may complain about this support for clean energy, but it has had a free pass to dump its effluent in the air for too long. We pay to treat our sewage, even though it would be cheaper to discard it in our streets and rivers; we now have to take the same approach to protect our atmosphere.

The sustainable energy sector has not been immune to the turmoil on the world's financial markets. The impact of the credit crisis started to make itself felt in early 2008, with stock prices falling nearly 20 per cent. Since then, however, investors seem to have regained their nerve. During the first half of 2008 total investment was only slightly lower than the year before. Asset finance also slowed as credit became more expensive. The public markets saw a very quiet first quarter this year, but other investment categories have taken up the slack. Venture capital and private equity investment logged a record quarter in the subsequent three months as companies completed private rounds rather than brave the turbulent public markets.

Indeed, the industry's resilience in the face of the current capital market conditions bodes extremely well for the future. Investment in sustainable energy must continue to grow strongly if we are to meet the ambitious targets for greenhouse gas reductions outlined by the 2007 G8 summit at Heiligendamm. At New Energy Finance we expect investment in clean energy to reach $600 billion annually by 2020, more than double these levels — with the Chinese power sector showing the most massive growth. But not-captured private sector investors are going to need to resolve the uncertainty that is causing them to hesitate to question the industry's strong fundamentals.

Clean energy is clearly no longer a niche investment class of interest only to specialists that it was even a couple of years ago. Mainstream investors, including pension funds, are starting to accept that the risks of not investing in clean energy are greater than the risks of doing so. Governments, utilities, oil majors, asset managers and pension funds are all racing ahead to build generation capacity, support promising new technologies and invest in one of the growing number of pure-play clean energy companies. Put simply, they have realised that it has become riskier to bet against clean energy than to bet on it.

Liz Thompson, the former Energy and Environment Minister of Barbados, was named a UNEP Champion of the Earth in 2008. The award is given annually to outstanding environmental leaders who have significantly influenced the protection and sustainable management of the planet's environment.

Each issue of Our Planet features the views of one of UNEP's Champions. For more information on the UNEP Champions of the Earth award see http://www.unep.org/champions/

regaining paradise

by Liz Thompson

In his epic poems *Paradise Lost* and *Paradise Regained*, John Milton explores the existence of paradise — and of losing and then regaining it. His theme, of course, is spiritual, but the concept of losing paradise could equally apply to the possible impact of climate change on the ecology and economy of the globe. Nowhere is this more likely than in the Small Island Developing States (SIDS). Their size, population and resource base severely constrain their production capacity, making them peculiarly vulnerable to environmental problems and economic shocks. They are on the front line of damage from climate change.

Many see the Caribbean as presenting a snapshot of the landscape of paradise. But they do not see how climate change threatens to distort or destroy the islands' idyllic image by damaging their physical environment, undermining economic gains and permanently compromising their peoples' quality of life. Fortunately, severe as the threat is, the prescription for regaining paradise is available. It is to reduce greenhouse gas emissions (and by so doing shrink our carbon and ecological footprints), and to pursue a paradigm of industrialization and social and economic development which is sustainable because it is predicated on renewable and infinite resources instead of finite, expensive and increasingly inaccessible fossil fuels.

UNDP's Human Development Report reminds us that climate change is "the defining human development issue of our generation" and cautions that "it is still a preventable crisis, but only just." This strikes an almost dire note when measured against the degree of uncertainty as to the outcome and final commitments expected from the 2009 Copenhagen conference to replace the present arrangements under the Kyoto Protocol.

Amazingly, the debate among policy makers and their negotiators continues to focus on nuances of language and the placement of brackets and punctuation — all in the name of protecting their national interest. To many people, such interests appear obscure, abstract and likely to be rendered irrelevant unless the global community can agree on strict fixed targets with specific time frames for reducing greenhouse gas emissions. This is imperative for SIDS: the environmental and economic danger they face will not be alleviated, to say the least, by the two degree increase in global temperature around which consensus seems to be coalescing. At current levels of 0.7 degrees, SIDS are on the edge of survival. A further 1.3 degree temperature increase will push them into crisis.

Caribbean SIDS — working assiduously to achieve the best development outcome, even though they bear only marginal responsibility for global greenhouse gas levels — have set targets for incorporating renewable energy technologies. They recognize that their rapid diffusion is critical for both cutting emissions and achieving sustainable development. Settled targets for renewables differ among the islands but generally range from 15 per cent to 30 per cent of total energy by 2020. Renewable energy projects have been and are being developed, many with the support of the Caribbean Renewable Energy Development Programme — an initiative of the Energy Ministers of the Caribbean Community to "reduce barriers to the increased use of renewable energy thus reducing the dependency on fossil fuels while contributing to the reduction of greenhouse gas emissions."

Caribbean development can be anchored on renewable energy. Several initiatives are in progress: Jamaica has a CDM-certified wind farm and the utility companies in Barbados, Guyana, Grenada and Dominica are also preparing to use wind power. Jamaica is experimenting with hydroelectricity, cogeneration from bagasse and biomass and is already adding ethanol to petrol. Some islands have landfill gas recovery; others are taking steps toward it. St Kitts Nevis is working on geothermal energy. The Barbados National Energy Policy 2007 allows householders and corporations to feed power from renewable sources into the national grid. Barbados already uses solar water heaters from its mature indigenous industry. It is the largest supplier of these units to other Caribbean islands, and one Barbadian manufacturer has even set up a factory in Nigeria. Guyana, with vast land and water resources, is developing biofuels and bagasse, and is working towards hydroelectricity. Finally, there has been much discussion about exploiting the temperature differential between surface and bottom temperatures in the Caribbean Sea through Ocean Thermal Energy Conversion.

The commendable efforts of Caribbean SIDS require greater collaboration from the international community. The developed countries, which are the largest emitters of greenhouse gases, have never quite fulfilled their commitment to make available adequate financial and technical resources to support the goal of poor developing countries, especially SIDS, of achieving sustainable social and economic development. The Caribbean thrust toward renewable energy technologies has the potential of creating competitive advantage, developing the kind of technology typical of the global knowledge economy which precipitates improvements in quality of life. The use of renewables earns revenue, reduces carbon footprints, diminishes dependency on fossil fuels, saves foreign exchange on petroleum products and ultimately enables sustainable development. These features characterize Brazil's highly successful experiment with ethanol.

Regional organizations calculate that in 2004 the cost of importing 100 million barrels of oil into the Caribbean was $6.5 billion, an exorbitant sum for the area's SIDS, already attempting to cope with food price increases and a shrinking share of global trade. The PetroCaribe agreement was the prescribed cure. Its terms include deferring payment for 60 per cent of supplied fuel for 25 years at a maximum interest rate of 2 per cent per annum. However, without identified funding or a clear strategy and implementation schedule for introducing renewable energy technologies, Caribbean signatories to PetroCaribe are digging a deep hole of debt from which they will find it very difficult to emerge. The twin state of Antigua and Barbuda graphically illustrates the point. In 2007 the country's population was estimated at 70,000 with a GDP of $1 billion. From the middle of 2006 to mid 2007, it accrued a debt under PetroCaribe of US $44.1 million. By December 2007, the total indebtedness of the twelve Caribbean and four Central American countries to Venezuela for fuel under the agreement had already reached $1.17 billion. How will they repay that colossal sum?

Venezuela has some marine boundary disputes across the region — and some of the islands of the Eastern Caribbean that are in its debt are about to offer marine territory for oil exploration. Will those offshore resources be claimed or offered against the debt owed? The situation could potentially allow Venezuela inextricably to entrench itself and assert sovereignty or influence over several islands' hydrocarbon resources. It may therefore be argued that apart from the universal urgency of the economic and ecological drivers of the introduction of renewable energy, geopolitical considerations also make it imperative that developed countries help Caribbean SIDS to establish a Renewable Energy Fund to finance the research, development and implementation of renewable energy technologies with the potential to transform and protect Caribbean society. The upcoming negotiations must recognize that reducing carbon emissions and establishing a renewable energy framework is required now. These measures are necessary globally — but are urgent for SIDS.

Paradise can be entirely lost, or the climate crisis can be halted and paradise regained. Whether we hold on to paradise is entirely up to us. We must make the required decisions and take the actions necessary to combat climate change as we journey toward Copenhagen.

making biofuels

sustainable

by Ed Gallagher

As the twentieth century drew to a close, there was considerable support for the use of biofuels as a source of renewable energy. To many people, they offered significant savings in greenhouse gas emissions compared to fossil fuels, an opportunity for reduced dependency on oil for transport, and potential as a counter weight to increasing oil prices. They also promised an opportunity for rural economies to benefit from a new market for their products and a chance of narrowing the gap between rich and poor nations.

Biofuel development was encouraged by government subsidies, and rapid growth occurred in many parts of the world. Forty per cent of Brazilian sugar cane is used for biofuel production, for example, as is almost a quarter of maize grown in the United States.

Although only around 1 per cent of arable land is cultivated to grow feedstock for biofuels, there has been increasing concern over the way a largely unchecked market has developed, and about its social and environmental consequences. Recent research has confirmed that food prices have been driven significantly higher by competition for prime agricultural land and that savings in greenhouse gas emissions are much smaller – and in some cases entirely eliminated – when environmentally important land, such as rainforest, is destroyed to grow biofuels. As a result, many now believe that the economic benefits of biofuels have been obtained at too high a social and environmental price, and they question whether they can be a truly sustainable source of energy.

The United Kingdom has always had sustainability at the heart of its biofuel policies and set up the Renewable Fuels Agency to ensure that this goal was met. The direct effects of biofuel production are already being assessed through five measures of environmental performance and two measures of social performance, as well as measures of the energy efficiency of the production processes used and of the greenhouse gas savings achieved. Previous land use is also recorded.

The indirect effects of biofuel production – such as land displacement – have recently been examined by a review commissioned by the UK Government and carried out by the Renewable Fuels Agency. It confirmed the concerns, and work is now under way to measure the indirect effects and incorporate them in reporting and analysis. It concluded that we need to be more cautious and discriminating in our use of biofuels and called for a slowing of targets until, in particular, the indirect efforts could be monitored and evaluated properly. But it also saw a way forward for a sustainable biofuels industry.

If this is to happen, biofuels should use the right feedstocks, be grown on the right land and use the least energy intensive production processes. Thus, ethanol derived from sugar cane, grown on land not needed for food production, farmed with an efficient use of fertilisers and produced using bagasse (sugar cane waste) as a source of energy, would be a sustainable biofuel. However, ethanol derived from maize using highly intensive farming processes, grown on land needed for food, and using energy from coal-fired power stations, would be an unsustainable one.

The Review recommended that biofuel production should be concentrated on idle agricultural land – areas that have been previously farmed but which would remain uncultivated if not used in this way – and on marginal areas which are unproductive when used for food crops or livestock. It also recommended increasing the use of wastes and residues for feedstocks and creating incentives for second generation biofuels using new technologies, such as cellulosic ethanol from woody plants or biodiesel from algae.

The Review also concluded that, left to itself, the market was unlikely to develop in a sustainable way, and so recommended more research into both indirect and direct effects and introducing internationally agreed mandatory sustainability standards. These should be accompanied by full public information to allow consumers to make their views known by purchasing fuels of which they approve.

While the contribution from biofuels may be more constrained and smaller than envisaged in the optimism of some years ago, they cannot be abandoned as part of a low carbon future, particularly for transport. They, along with other measures, will be needed to cope with the developed world's increasing appetite for travel and the millions of new motorists expected in India, China, Russia and elsewhere.

verbatim

"We have experienced great economic transformations throughout history: the industrial revolution, the technology revolution, and the era of globalization. We are now on the threshold of another: the age of green economics.... With the right policies and a global framework, we can generate economic growth and steer it in a low-carbon direction. Handled properly, our efforts to cope with the financial crisis can reinforce our efforts to combat climate change. In today's crisis lies tomorrow's opportunity – economic opportunity, measured in jobs and growth."

U.N. Secretary-General Ban Ki-moon

"What's green for the environment can also be green for the economy... solar is the future; it's now; it can't be stopped."

California Governor Arnold Schwarzenegger at the Solar Power International 2008 Convention in San Diego

"China from its own perspective must realise sustainable development, we must save energy, raise energy efficiency, develop renewable energies and adopt measures aimed at reducing greenhouse gases."

Chinese Vice Minister of Planning Xie Zhenhua

"We need to ensure that we drive investment in renewable energies so that Australia, as we shift to a lower carbon economy, does have a range of energy options available to us. We don't know now, at this point in time, which of these options is going to be the most commercially viable, but what we do know is we need to invest now to ensure we have those options on energy into the future."

Australian Environment Minister Penny Wong

"So much has happened in the renewable energy sector during the past five years that the perceptions of some politicians and energy sector analysts lag far behind the reality of where the renewables industry is today."

Mohamed El-Ashry, Chair of REN21

"Moving a strong portfolio of renewable energy technologies towards full market integration is one of the main elements needed to make the energy technology revolution happen."

Nobuo Tanaka, Executive Director of the International Energy Agency

"If we're serious about global warming and its consequences, then the market has to address all the sources of greenhouse emissions."

President Bharrat Jagdeo of Guyana, who wants international investors to pay for the increasingly tangible benefits of preserving rainforest habitats

numbers

41
gigatonnes of global energy-related CO_2 emissions projected for 2030 under current trends, a 45 per cent increase from 2006 levels. Overall greenhouse-gas emissions, including non-energy CO_2 and all other gases, are projected to grow by 35 per cent, from 44 to 60 gigatonnes of CO_2 equivalent over the same period. — *International Energy Agency*

2.7
humanity's per-person footprint in hectares. The Earth needs an average 2.1 hectares per person to produce our resources and capture emissions — *WWF Living Planet Report*

627
number of endangered species in Brazil, up from 218 species in 1989 — *Associated Press / Brazilian Environment Ministry*

2.4
millions of jobs in the renewable energy sector around the world, including renewable energy manufacturing, operations and maintenance. — *REN 21*

27 billion
amount in U.S. dollars raised by clean energy companies on the world's public markets in 2007 – double the amount raised the previous year. — *UNEP Global Trends in Sustainable Energy Investment 2008*

65
number of countries with national goals for accelerating the use of renewable energy. — *REN 21*

4151
number of CDM projects in the pipeline around the world. Africa hosts 84 projects, 27 of them in South Africa. — *www.cdmpipeline.org*

2
percentage of total energy the United Kingdom produces from renewables. In Germany the figure is 8.5 per cent. — *The Guardian*

23
percentage of new electricity generating capacity made up by renewable energy in 2007 — *UNEP Global Trends in Sustainable Energy Investment 2008*

2.5 million
number of households around the world that use solar lighting systems. — *REN 21*

32
India's percentage of Clean Development Mechanism (CDM) projects. China has 19 per cent and Brazil 13 per cent. — *UNEP Global Trends in Sustainable Energy Investment 2008*

books

Green Jobs: Towards decent jobs in a sustainable low-carbon world

This new study on the emerging global 'green economy' – funded and commissioned by UNEP with the International Labour Office, the International Trade Union Confederation and the International Organization of Employers – says tackling climate change could create ten[illegible] of millions of new jobs in areas like renewable energy, construction, transport, agriculture and forestry, noting that the global market for environmental products and services is projected to double from the current $1,370 billion a year to $2,740 billion by 2020.

Atmospheric Brown Cloud report

This report presents the latest findings on the Atmospheric Brown Cloud phenomenon and analyzes its implications for global and regional climate change and the lives and livelihoods of some three billion people. In Asia, a band of soot and particles more than three kilometres wide, caused by burning of fossil fuels and biomass, stretching from the Arabian Peninsula to China, is triggering a series of complex climatic changes. The scientists behind the report have identified a further five regional ABC hotspots, including eastern China, southern Africa and the Amazon basin, and list 13 cities which are major contributors to the ABC phenomenon.

Biodiversity and Carbon Atlas

This atlas by the UNEP World Conservation Monitoring Centre shows the spatial relationship between areas of high carbon stock and areas of biodiversity value, with maps of regions and individual countries. The object is to demonstrate how datasets and mapping tools can help the REDD initiative (Reducing Emissions from Deforestation and Degradation) to deliver both reduced carbon emissions and benefits for biodiversity.

Global Glacier Changes: facts and figures

Climate change is shrinking and thinning glaciers worldwide, putting water supplies at risk for billions of people. This report provides an illustrated global overview of the available data on glaciers and ice caps, their distribution and their documented changes. It concludes that if trends continue and governments fail to agree on deep emission reductions at the crucial U.N. climate convention meeting in Copenhagen in 2009, glaciers may completely disappear from many mountain ranges.

Climate Action

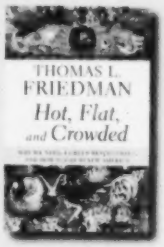
Climate Action is an annual publication produced by Sustainable Development International in collaboration with UNEP. It features authoritative voices from governments, intergovernmental organisations, civil society and the private sector on climate change mitigation, adaptation, technology and finance, and includes an 'Actions' section detailing steps that businesses and governments can take to reduce their carbon footprint.

Impacts of Climate Change: How can we adapt?

This Simplified Guide to the IPCC's Climate Change 2007: Impacts, Adaptation and Vulnerability summarises the report of Working Group II of the IPCC's Fourth Assessment Report under 16 key messages.

www.unep.org/publications

Hot, Flat and Crowded: Why We Need a Green Revolution – And How it Can Renew America



Thomas Friedman (Farrar, Straus and Giroux, September 2008)
Influential New York Times journalist Thomas Friedman turns his attention to global warming and energy, arguing that the U.S. needs to set an example for the world by building a new clean energy system based on renewable energy and reshaping the market through a new regime of taxes, incentives and price signals. The much-touted 'green revolution' has hardly begun, he says, adding that the U.S. must lead with a Green New Deal, spurred by the 'greenest generation' and the first 'green President'.

2008 World Energy Outlook

(International Energy Agency, 2008)
The International Energy Agency's 2008 World Energy Outlook maps global energy trends, with projections to 2030. It looks at whether the world is facing a supply crunch, and asks what type of post-Kyoto policy framework could stabilize greenhouse gases at low concentration levels. It also provides in-depth analysis of post-2012 climate change policy scenarios, oil and gas supply prospects and energy poverty in resource-rich sub-Saharan African countries.

World Resources Report 2008: Roots of Resilience: Growing the Wealth of the Poor

(World Resources Institute, 2008)
This World Resources Institute report analyzes how sustainable, nature-based enterprise can help the world's two billion rural poor escape the poverty trap. It outlines potential government actions, saying that scaling up environmental income requires ownership, local capacity and adaptive networks. It argues that improving rural livelihoods can help cushion climate change impacts and provide social stability.

OECD Environmental Outlook to 2030

(Organization for Economic Cooperation and Development, 2008)
Tackling the key environmental problems we face today – including climate change, biodiversity loss, water scarcity and the health impacts of pollution – is both achievable and affordable, according to this OECD report. It provides analyses of economic and environmental trends to 2030 and highlights a mix of policies that can address these challenges.

enough
is
enough
by Lalita Ramdas

Climate change's gross inequity is one of the most shocking things about it. "Global warming" as UNDP's Human Development Report has recently pointed out "is not a future apocalypse, but a present reality for many of the world's poorest people..." Less than 2 per cent of those affected by what it calls global "climate shocks" live in rich countries.

Mass poverty, combined with a worsening ecological and economic security scenario, could create huge numbers of climate refugees, aggravating social and other tensions in ways that would make today's 'war on terror' pale into insignificance. Some 125 million people, for example, could be displaced from their homes in India and Bangladesh in the next few decades if action is not taken to curb climate change.

Greenpeace has been a frontrunner in alerting the public to the Earth's deteriorating condition through audacious, sometimes confrontational, but always non-violent actions. Often we ploughed a lonely furrow. Today we are no longer alone — the world now acknowledges that climate change is arguably the most serious threat of our times. We believe it is ethically and ecologically imperative to build a clean energy system based exclusively on the efficient use of renewable energy sources. Our core objectives should be to protect the environment, to ensure sustainable and equitable development for all, and to guarantee a safe and nuclear-free world for future generations. Ultimately, energy security is the best guarantor of human security.

Climate change is both an opportunity and a challenge. For us, it has served as a catalyst and an invitation for an energy revolution — outlined in the *2007 Energy [R]evolution* scenario. The message is simple: it is possible to cut greenhouse gas emissions and avoid the worst of climate change with existing technologies — as well as phase out nuclear power — by switching to renewable energy and improving energy efficiency. The European Renewable Energy Council and 10 institutions joined Greenpeace in producing the scenario, which is modelled by the German Space Agency. It credibly shows that a solution to greenhouse gas emissions from energy exists, and that all that is lacking is political will from governments. Among its recommendations are that the world must get on a course to stay as far as possible below a two degree Celsius temperature rise. Global greenhouse gas emissions must be more than halved by 2050. This can be done by employing sustainable renewable energy and energy efficiency.

The International Energy Agency (IEA) estimates that approximately 10 trillion dollars must be spent in the next couple of decades on replacing power plants and other energy infrastructure in industrialized countries and on building new infrastructure in the rapidly industrializing South. The political and economic conditions which shape those investments will determine our energy future to the middle of this century and beyond. It is in that context that we will avoid dangerous climate change, and nuclear disaster — or not.

Coal, biofuels and nuclear power will undoubtedly jostle for much of this investment if there is not a clear-headed vision of what a renewables-based future has to offer. The nuclear industry has already influenced top leadership in many national governments to commit to the atom as an essential part of the energy mix. Yet, we believe it is not part of the climate solution but an expensive and dangerous distraction.

Industrialized nations need to make binding commitments to cut emissions by 30 per cent in 2020 and 80 per cent in 2050 through domestic measures, and to direct massive funds for decarbonization to developing countries. The proportion of the sun's rays that reaches the Earth's surface can alone satisfy global energy consumption 10,000 times over. On average, each square metre of land is exposed to enough sunlight to receive 1,700 kilowatt-hours of energy each year. Alternative and renewable technologies — especially solar and wind — are enjoying unprecedented growth and economic productivity. By one estimate the net worth of the solar electricity market is already €13 billion annually.

There are three major components to charting a carbon-free and nuclear-free energy road map. We must say "no to nukes", by phasing out existing reactors and subsidies to nuclear energy, and by building no more commercial reactors. We must say "yes" to a renewable energy future by reallocating resources from existing support for nuclear and fossil fuel technologies to clean, renewable energy research, and by setting legally binding targets for renewable energy, while ensuring stable returns for investors.

The current political leadership seems to be hedging its bets as it plays around with the dangerous cocktail of nuclear, coal and biofuels — none of them clean, green or unlimited. Courage and confidence is needed to seize the moment and opt for renewables and tough efficiency measures. New voices are needed to speak up and convince our leaders on the basis of solid arguments combined with number crunching.

As a grassroots activist, I challenge the green movement to build new partnerships and alliances — with poor and indigenous communities and with the women's movement — in our battle to save our fragile ecosystem. Do we have the courage to mobilize the power and energy of those who stand to lose the most from the direct impact of global warming and who can therefore put pressure on their leaders? The Human Development Report points out that climate change poses challenges at many levels and challenges all people to reflect on how we manage the environment of the one thing that we share in common: planet Earth.

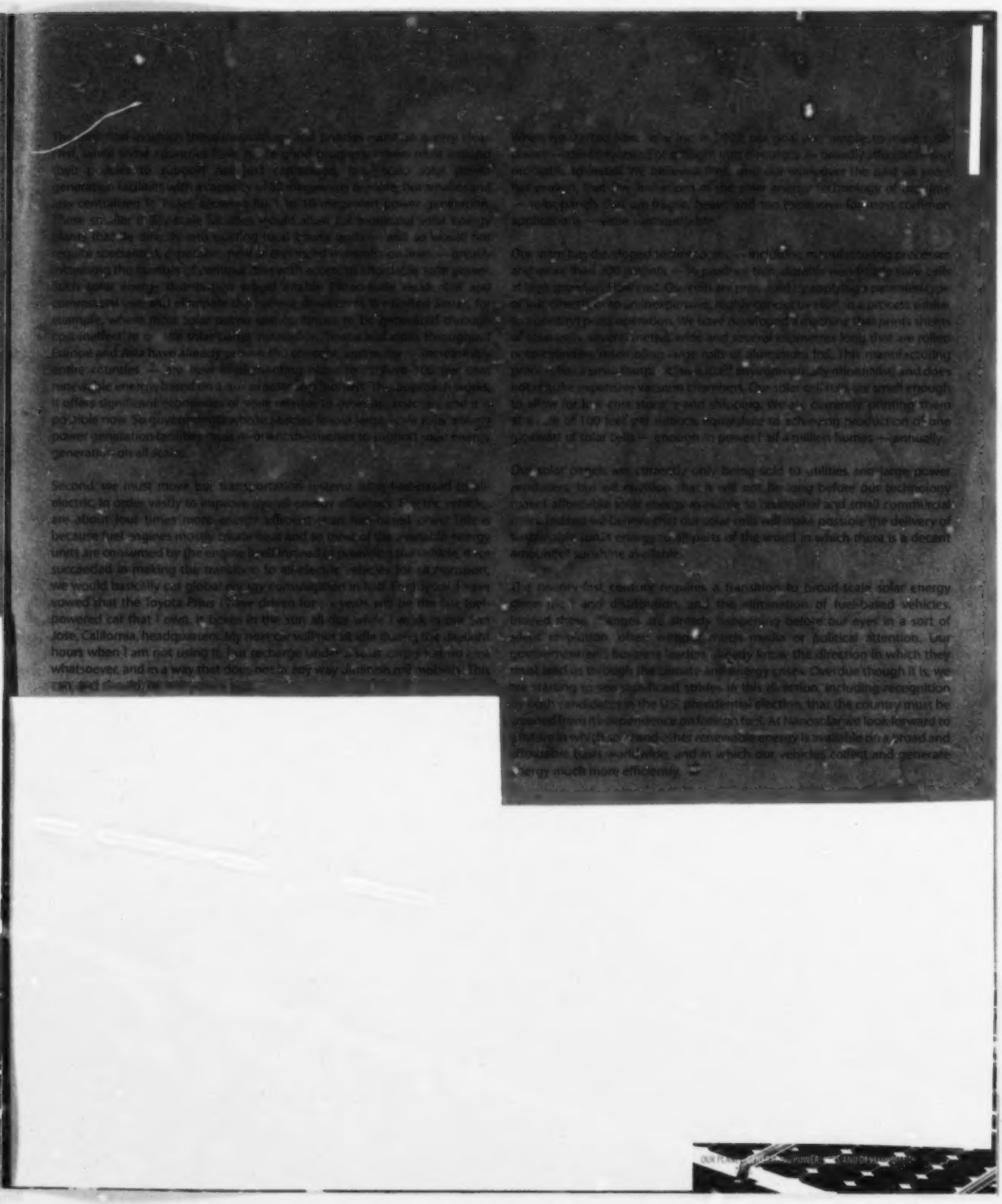
Time is not on our side. It is now 11 years since the Kyoto Protocol was agreed — and it is not nearly strong enough to tackle climate change. Governments must be willing to act with urgency, and with the swiftness of somebody whose house is on fire, for indeed our planetary home could well be ablaze if action is not taken. It is up to us, the public, to keep up the pressure and point out that corporate interests are not always those of the people.

Finally, as Arjun Makhijani, points out in the preface to his book *Carbon-free — Nuclear-free: An Energy Road Map for the U.S.*, "the history of development shows that the norms for the good life are set by the wealthy. We must develop the notion of ENOUGH." We ignore at our cost Mahatma Gandhi's timeless advice on sustainability: "The Earth has enough for everyone's need but not for everyone's greed." We need the courage to say: "Enough is enough!"

green valley

by Martin Roscheisen

Many companies like mine are emerging from Silicon Valley with a business mission to contribute technologies to help solve the climate crisis. We believe government and business leaders around the world should be doing all they can to encourage and support such innovation. At Nanosolar — which this year completed a $300 million strategic equity financing — we manufacture our products in California and in Germany, both of which provide substantial subsidies to businesses developing renewable energy solutions.



innovation agenda

by Daniel M. Kammen

Retooling the global economy for a low-carbon and environmentally responsible future must begin immediately — and a major new United States initiative in this area is vital. The recent downturn in the economy makes this change all the more necessary: energy efficiency and renewable energy can be an engine of dramatic new economic growth and job creation. It will be up to the incoming president to marshal public and industry sentiment behind such a reinvestment in our future.

We are at last seeing a global explosion of financial and political interest in energy, focused largely — but, ominously, not exclusively — on clean energy, since, in addition, to solar, wind and other low-carbon sources, investments in some of the most CO_2-intensive sources are also on the rise. Innovation is the life-blood of economic growth and renewal. It has been known for decades that the bulk of new growth results from the invention, and re-invention, of new scientific and technological opportunities. Over 50 years ago Economics Nobel Laureate Robert Solow concluded that over 90 per cent of new economic growth results from public and private sector investments in innovation.

Yet energy is very short of investment in research and development (R&D) despite arguably now posing our top environmental and geopolitical security threa... Total investment on R&D in the U.S. as a whole stands at roughly three per cent of the U.S. gross domestic product, but, for energy, it is proportionally only about one-tenth of that level. By contrast, research and development investments in the medical and biotechnology field are roughly 15 per cent of sales — almost a staggering 40 times more than for energy. This argues that, at minimum, energy R&D should be increased to the three per cent national average.

In a recent set of papers, Prof. Greg Nemet, of the University of Wisconsin, Madison, and I, concluded that, as a starting point, federal energy R&D investment should be dramatically increased, five- to ten-fold from its current anaemic level of $3–4 billion a year. Public-sector spending alone will not solve the energy and climate problem, and a budget increase of this magnitude will need to be carefully ramped up over years, but without a serious federal commitment to 'prime the pump', government will not send the right signal to the U.S. and global industry that climate is the top priority.

Public investments of this sort in the United States have been repaid many times over. A well-organized and successful campaign to double the federal medical/biotechnology R&D budget during the 1990s resulted in an eleven- to twelve-fold increase in private sector investment and innovation. Recent investment in nanotechnology is already paying off at a ratio of almost 20 to 1. Innovation is good business.

It is vital that the United States fully embraces this issue, and becomes a global leader. Addressing the risk of significant climate change will require an estimated 80 per cent or more reduction in global greenhouse gas emissions over the next five decades. The U.S. and China together now account for almost half of all greenhouse gas emissions, so clean energy development and deployment work needs to be accelerated in these two countries.

Making clean energy a major national priority will pose political challenges, but no nation is better positioned to adopt a low-carbon energy path than the U.S. It not only has tremendous clean energy resources, but major companies looking to take advantage of a change in federal policy to compete in the global clean energy economy.

The U.S. and China also share a special bond — both good and bad. Each is strongly dependent on coal, but jointly they have the technical capacity to alter that situation. Both have exceptional wind and solar thermal energy resources; indeed, they are the 'Saudi Arabia and Kuwait of wind power'.

Clean energy is also the best diplomacy. Energy infrastructure is needed around the planet, particularly in the poorest developing nations. Renewable energy and energy efficiency can often be installed and put into operation far faster than traditional fossil fuel facilities, and with far greater flexibility on home, village, town or city scales. The U.S. with the world's most extensive — though historically not always the best funded — international development network could speed the clean energy revolution, putting human rights, gender equality, economic opportunity and environmental quality squarely in the forefront of the priorities of every community and national leader worldwide.

The economic slow-down in the United States highlights the need for a job boom. Clean energy has been shown to generate three to five times more jobs per dollar — or yuan — invested, than comparable investments in fossil-fuels. This can make clean energy and energy efficiency a popular bi-partisan political cause. Politically, global warming and clean energy legislation is big in the U.S.

The new U.S. president and his administration can also build on a number of courageous and critically needed experiments by states and regions in designing carbon cap and trade programmes that can form the basis of needed federal legislation. The Global Warming Solutions Act of 2006 in California is one example. The regional Greenhouse Gas Initiative in the Northeast and Mid-Atlantic States is another. The Midwest is developing what promises to be an aggressive climate policy and has exceptional wind and solar resources.

Already over half of U.S. states have passed requirements for a fraction — generally 15–25 per cent — of all electricity to come from renewable sources by 2020–2025. The American century of clean energy is primed for launch. What we need is a charismatic and motivating leader with the vision and commitment to make it happen. The U.S. must mobilize the world's largest research and development capacity to protect our future and to build a diverse set of new industries. Wouldn't that be a grand and globally welcome American signature for the new century?

WWW

Renewable Energy: Useful Links

This page contains links to websites from governments, international organizations, non-governmental organizations, businesses, media, and other groups from around the world to help you research issues related to renewable energy. We have compiled these links from our own review of the vast amount of information available on the Internet to help you to find the most relevant sources for your research. *Our Planet* magazine does not, however, endorse the viewpoints of any of the groups to which we link, and we cannot guarantee the accuracy of the information posted on these sites. Rather, we hope to provide you with a broad range of opinions and perspectives.

Resources

http://www.iea.org/textbase/subjectqueries/keyresult.asp?KEYWORD_ID=4116
The International Energy Agency acts as energy policy advisor to 28 member countries to support their effort to ensure reliable, affordable and clean energy.

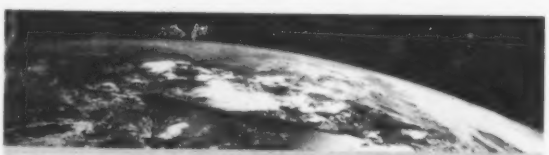
http://www.renewableenergyworld.com/rea/home
Renewable Energy World.com specializes in renewable energy news and information. The site provides access to renewable energy-focused services, products, technology overviews, events calendar and job opportunities.

http://www.re-energy.ca/
Re-Energy.ca is a renewable energy project kit that can be downloaded and printed from the World Wide Web – for free! The website explores wind energy, water energy, solar energy, biomass energy and more.

http://www.solarcookers.org/index.html
Solar Cookers International (SCI) assists communities to use the power of the sun to cook food and pasteurize water for the benefit of people and environments.

http://energy.sourceguides.com/businesses/index.shtml
An international guide to renewable energy companies worldwide, searchable by sector and geographic location.

http://rebn-east.weebly.com/
The Renewable Energy Business Network (REBN) enables business professionals with an interest in renewable energy to connect with one another, to promote the growth of the renewable energy industry. REBN provides opportunities for networking, education and business creation.



blogs

http://ease.typepad.com/energysavers
The Energy Savers Blog provides a place for consumers to learn about and discuss energy efficiency and renewable technologies at home, on the road, and in the workplace.

http://alt-e.blogspot.com/
The alternative energy blog provides news, views and strong opinions on alternative energy resources, including solar energy, wind power, wave energy, geothermal and other renewable energy sources, plus news on other energy issues, including the end of cheap gas and oil, plug-in hybrid cars, rising fuel prices, 'clean' coal and nuclear power.

http://renewableenergylaw.blogspot.com/
The renewable energy law blog provides news and commentary on the evolving law, science, and policy of renewable energy development

www.unep.org

http://www.sefi.unep.org/ – The Sustainable Energy Finance Initiative (SEFI) provides financiers with the tools, support and global network needed to conceive and manage investments in the complex and rapidly changing marketplace for clean energy technologies.

http://www.uneptie.org/energy/ – UNEP's Energy Branch brings a longer-term environmental dimension into energy sector decisions. Activities aim to help decision makers improve their understanding of the link between the energy choices they face and broader sustainable development issues.

http://www.uneptie.org/energy/tools/ghgin/index.htm – The GHG Calculator is a tool to help businesses and non-commercial organizations calculate their greenhouse gas emissions.

http://www.unep.ch/etb/ – UNEP's Economics and Trade Branch seeks to conserve the environment, reduce poverty, and promote sustainable development by enhancing the capacity of governments, businesses and civil society to integrate environmental considerations into economic, trade and financial policies and practices in accordance with the partnership and integrated policy making approaches of sustainable development.

http://uneprisoe.org/ – The UNEP Risoe Centre on Energy, Climate and Sustainable Development (URC) supports UNEP's efforts to incorporate environmental aspects into energy planning and policy worldwide, with a special emphasis on developing countries.

http://www.unep.org/themes/energy/?page=home – UNEP's energy website provides information on key UNEP activities at the global and regional levels, and on energy-related policies and strategies.

http://www.energy-base.org/ – UNEP Collaborating Centre the Basel Agency for Sustainable Energy works to promote increased finance sector engagement in sustainable energy in both developing and industrialized countries.

http://swera.unep.net/ – The Solar and Wind Energy Resource Assessment (SWERA) Programme provides easy access to high quality renewable energy resource information and data to users all around the world.

Online Journals

http://www.elsevier.com/wps/find/journaldescription.cws_home/969/description#description
The official journal of the World Renewable Energy Network helps researchers, economists, manufacturers, world agencies and societies to keep abreast of new developments in their specialist fields and to unite in finding alternative energy solutions to current issues such as the greenhouse effect and the depletion of the ozone layer.

http://nl.sitestat.com/elsevier/elsevier-com/s?eSelect&ns_type=clickout&ns_url=https://eselect.elsevier.com/clickin/journal.cfm?issn=03062619
Applied Energy provides a forum for information on innovation, research, development and demonstration in the areas of energy conversion and conservation, the optimal use of energy resources, analysis and optimization of energy processes, mitigation of environmental pollutants, and sustainable energy systems.

http://nl.sitestat.com/elsevier/elsevier-com/s?eSelect&ns_type=clickout&ns_url=https://eselect.elsevier.com/clickin/journal.cfm?issn=03605442
A multi-disciplinary forum for activities relating to the development, assessment and management of energy-related programmes.

National Online Resources

http://www.nrel.gov/
U.S. National Renewable Energy Laboratories (NREL) is the primary laboratory for renewable energy and energy efficiency research and development in the U.S. NREL's mission and strategy are focused on advancing the U.S. Department of Energy's energy goals and support critical market objectives to accelerate research from scientific innovations to market-viable alternative energy solutions.

http://www.acore.org/membership
Over 500 organizations creating a leadership forum across renewable energy sectors to develop better understanding of renewable energy and its benefits in the U.S.

http://www.environment.gov.au/settlements/renewable/
The interactive Renewable Energy Atlas provides information on Australia's renewable energy resources. The Atlas profiles wind, solar, geothermal, ocean energy and bioenergy resources. The site also contains contextual data such as energy infrastructure, transmission lines and power plants, roads, land tenure and climate information.

Sunshine and light showers are forecast for the Oscar winning actor Cate Blanchett as she increasingly greens her lifestyle. She is installing solar panels to power her Sydney home and has cut her showers back to a maximum of four minutes to help save water in drought-stricken Australia. And that is only a beginning, for she is also greening her main place of work, is campaigning on solar power and climate change, and has committed to other changes in her life to save energy and water.

Blanchett — who sprang to fame in the title role of the film Elisabeth ten years ago — learned conservation when growing up in Melbourne in the 1970s from her grandmother who had lived through the Great Depression and, as a result, insisted in recycling and on letting nothing go to waste. She grew up to win an Oscar for her role in Martin Scorsese's The Aviator, amid a host of other top awards, and was spurred into environmental activism by reading about her country's growing water crisis.

She says: "As I see it, there is no greater challenge we face as a species than dealing with climate change and its effects. I care about it because of my children. I want to safeguard their future. It is an inescapable problem, but also provides us with an opportunity to change for the better. To change the way we consume, the way we think, and the way we behave. By assuming responsibility, we protect and respect the generations behind us."

Together with her husband, playwright Andrew Upton, she has started by setting out to "greenovate" their home: powering it with solar energy, using natural air flows rather than air conditioning to cool it, and recycling grey water. The couple also plan to extend the improvements to the Sydney Theatre Company, where they are joint artistic directors, with the aim of running off-grid for a whole season.

"I really love a refreshing shower," she says, but has installed a timer to stop them after four minutes. Indeed she tries to make them even shorter. "I actually have little races with myself thinking 'I'm not washing my hair, so I only need to have a two-minute shower'. I'm just trying to do my bit. I do live in a desert called Australia, you know."

Blanchett has also committed to setting her washing machine to wash her clothes in cold water, to drive 20 kilometres less each week, and to avoid one domestic flight a year. Are those transport commitments big enough? "Look" she has said: "I live in the modern world as much as anyone else. I use a car and I have been flying far more than I am comfortable with. So it's been really important for me to offset my flights, which I do."

She also campaigns on climate change, visiting a drought-stricken Australian lake to call attention to the crisis, going on a march with her children and promoting last year's Earth Hour which encouraged people to turn off all lights for sixty minutes to kick-start a campaign to cut Sydney's greenhouse gas emissions.

Earlier this year Blanchett became a primary investor in a Californian start-up company that aims to make it easy to install solar. By using satellite imaging it calculates the dimensions of a customer's roof, selects the right panels and installs them. And she is patron of SolarAid, a charity that trains rural communities in Africa to build solar radios, lanterns, mobile phones and other devices and then helps them set up small businesses to sell them.

CATE BLANCH

ETT

www.unep.org/ourplanet